

Claims

What we claim:

1) A valve, comprising:

5 a fluid channel plate with a top surface and a bottom surface with two or more
inlet ports and one or more outlet ports connecting said surfaces;
a membrane plate with a top surface and a bottom surface wherein said bottom
surface is attached to said top surface of said fluid channel plate, said
membrane plate including a displaceable membrane portion to selectively
obstruct one or more of said inlet ports of said fluid channel plate; and
10 means for proportionately actuating said displaceable membrane portion attached
to said top surface of said membrane plate.

2) The valve of claim 1 wherein the ratio of the sum of the periphery of
said inlet ports to the square root of the sum of the areas of said inlet ports is
15 greater than four.

3) The valve of claim 1 wherein the valve is a micromachined valve.

4) The valve of claim 3 wherein the ratio of the sum of the periphery of
20 said inlet ports to the square root of the sum of the area of said inlet ports is
greater than four.

- 5) The valve of claim 3 wherein said membrane plate is formed from the group
comprising alumina, germanium,
glass, Pyrex, silicon and silicon dioxide.
- 5 6) The valve of claim 3 wherein the top surface of said inlet port has an
annulus of dimension less than the diameter of said port and extends
above said fluid channel plate top surface.
- 7) The valve of claim 3 wherein said membrane plate is formed from
10 single crystal silicon and said displaceable membrane portion is less than 100
microns thick.
- 8) The valve of claim 3 wherein said un-actuated displaceable membrane
portion is positioned less than 100 microns from said top surface of said inlet
15 ports.
- 9) A micromachined microvalve, comprising:
a fluid channel plate with a top surface and a bottom surface with one or more
inlet ports containing a plurality of convolutions in its top surface
20 periphery, and
one or more outlet ports connecting said surfaces; and
a membrane plate with a top surface and a bottom surface wherein said bottom

surface is attached to said top surface of said fluid channel plate, said
membrane plate including a displaceable membrane portion to selectively
obstruct one or more of said inlet ports of said fluid channel plate; and
means for proportionately actuating said displaceable membrane portion attached
5 to said top surface of said diaphragm plate.

10) A method for maximizing the flow while minimizing the inlet pressure of a valve,
comprising the steps:

selecting the fluid, and

10 selecting the wetted materials, and

selecting operating values for six variables from a list comprising:

flow, temperature, inlet pressure, outlet pressure, area enclosed by the inlet
ports, periphery length of the inlet ports, and separation between the
displaceable membrane and the top surface of the inlet ports at full scale

15 flow; and

calculating the value of the seventh variable by using a High Flow
Periphery Algorithm.